

## Subfamily MADOQUINÆ.

## Genus MADOQUA, Ogilby.

An example of *M. kirki* from British East Africa (*F. C. Selous*) agrees with the specimen of *M. phillipsii* described by me in 1910 in the structure of the pedal glands and the absence of inguinal glands. There were two pairs of mammae.

The Madoquinae (*Madoqua* and *Dorcotragus*) differ from the other antelopes considered in this paper by the structure of the muzzle and rhinarium.

## PROCEEDINGS OF LEARNED SOCIETIES.

## GEOLOGICAL SOCIETY.

April 17th, 1918.—Mr. G. W. Lamplugh, F.R.S.,  
President, in the Chair.

The following communication was read:—

‘The Evolution of the Liparoceratidae.’ By Arthur Elijah  
Trueman, M.Sc., F.G.S.

The Ammonites considered include several sub-parallel series, of which four genera were indicated by Mr. S. S. Buckman in ‘Yorkshire Type Ammonites.’ The details of ontogeny and the sutures, which had not hitherto been compared, have been employed in constructing tables showing both the biological and the stratigraphical relations of the various species; a revision of the existing classification is proposed.

The early members of each series are similar ‘capricorn’ forms with slender whorls and stout ribs (for instance, *A. capricornus*, *A. latecosta*, *A. maculatus*). In somewhat later examples the outer whorl is swollen, and has paired tubercles (for instance, *A. heterogenes*). From this stage the tendency is to shorten the period with slender capricorn whorls by accelerating the development of bituberculation and prolonging the period of pre-costate globose whorls; thus the most advanced members of each series are stout bituberculate forms (for instance, *A. striatus*, *A. bechei*), which do not pass in development through a capricorn stage.

The following genera may be recognized; each includes ammonites of the three types mentioned above:—

1. An earlier group, with tubercles paired in the involute stages; Radstock (Somerset) is the only British locality where these ammonites have been found.

*Parinodiceras*, gen. nov. Elevated whorl, paired tubercles, the inner and outer rows widely separated. Genoholotype, *Ammonites striatus parinodus* Quenstedt (1884, pl. xxviii, fig. 6).

Gen. nov. Round whorl, with the rows of tubercles placed close together. Genoholotype, a specimen to be figured as a new species.

2. A later group, with unpaired tubercles in the involute stage. These genera are most readily distinguished by sutural characters, namely, the relative depths of the external lobe (EL) and the first lateral lobe (IL), and by the width of the external saddle (ES).

(a) With narrow ES (not reaching to the outer tubercles).

*Liparoceras* Hyatt. IL and EL about equal in depth. Genoelectotype, *Ammonites striatus* Bronn.

*Becheiceras*, gen. nov. IL deeper than EL. Genoholotype, *Ammonites bechei* Wright. ('Lias Ammonites' pl. xli, fig. 1.)

*Anisoloceras*, gen. nov. IL much deeper than EL, the ventral lobules of IL almost meeting under EL. Genoholotype, *Ammonites nautiliformis* J. Buckman.

(b) With wide ES, reaching to the outer tubercles.

*Ægoceras* Waagen. EL and IL about equal in depth, IL symmetrical. Genoelectotype, *Ammonites planicosta* d'Orbigny.

*Androgynoceras* Hyatt. IL and EL about equal in depth, IL asymmetrical. Genoelectotype, *Ammonites hybrida* d'Orbigny.

*Oistoceras* S. S. Buckman. Ribs with sharp peripheral curve. Suture similar to *Androgynoceras*. Genoholotype, *Ammonites figulinus* Simpson.

*Amblyoceras* Hyatt. Ribs with slight peripheral curve. IL shallower than EL. Genoholotype, *A. capricornus* Hyatt, 1900.

These ammonites generally occur in the upper part of the Lower Lias, where it has been usual to recognize a *capricornus* zone overlying a *striatus* zone. Careful collecting has shown, however, that there are several horizons with capricorn ammonites of different series and several with the involute forms evolved from them, as shown below:—

<i>margaritatus</i> zone.	{	Bituberculate ammonites of the <i>A. nautiliformis</i> series.
		Bituberculate " " <i>Oistoceras</i> .
		Capricorn " " <i>Oistoceras</i> .
<i>davœi</i> zone .....	{	Bituberculate " " the <i>A. bechei</i> series.
		Bituberculate " " <i>Ægoceras</i> & <i>Androgynoceras</i> .
		Bituberculate " " <i>Amblyoceras</i> .
		Capricorn " " <i>Amblyoceras</i> .
		Capricorn " " <i>Ægoceras</i> , <i>Androgynoceras</i> .
<i>ibex</i> zone .....	{	Capricorn " " <i>Beaniceras</i> .
		Bituberculate " " <i>Liparoceras</i> .
		Capricorn " " <i>Liparoceras</i> .
		Bituberculate " " the first group (with paired tubercles).

In no locality that has been examined is the complete sequence shown. The absence of some groups is due to the original distribution of the ammonites; in other cases it is due to non-sequences (for example, the upper part of the *davœi* zone is not represented in Gloucestershire).

Two groups of Lias Ammonites are recognized, namely: (i) those which were evolved directly from a globose ancestor; this includes the *Liparoceratidæ*, *Echioceratidæ*, *Hildoceratidæ*, *Polymorphidæ*, *Deroceratidæ*; and (ii) those which passed through an intermediate broad-ventered (cadicone) stage; these include the *Amaltheidæ* and *Dactyloidæ* (with *Beaniceras*).